

IN THE CLAIMS

Please find a reproduction of all the pending claims below, including a status identifier for the claims, wherein claims 1 and 7 have been amended and claims 5 and 6 have been canceled:

1. (Currently amended) A functional printed circuit board (PCB) module having an embedded chip, the PCB module comprising:

a frame having two opposite sides and at least one chip ~~recess~~ hole defined ~~[[in]]~~ through the frame;

a first printed circuit formed on one side of the frame and insulated from the frame;

at least one chip mounted in the at least one chip ~~recess~~ hole and connected to the first printed circuit, wherein the at least one chip has a top face, a bottom face and multiple terminals each of which is formed on the top face and connected to the first printed circuit; and

insulation material filling the at least one chip ~~recess~~ hole.

2. (Original) The functional PCB module as claimed in claim 1, wherein the frame is nonmetallic.

3. (Original) The functional PCB module as claimed in claim 1, wherein the frame is metal and further comprises a first insulation layer between the first printed circuit and the frame.

4. (Currently amended) The functional PCB module as claimed in claim 3, wherein the first insulation layer has multiple through holes corresponding to the

terminals defined through the first insulation layer and the insulation material in the at least one chip ~~hole~~ recesses; and

multiple plugs are formed respectively in corresponding through holes to connect the first printed circuit to the at least one chip.

5. (Original) The functional PCB module as claimed in claim 4 further comprising:

a second insulation layer formed on the other side of the frame;
a second printed circuit layer formed on the second insulation layer; and
multiple vias each of which has an outside and is formed through the first printed circuit, the first insulation layer, the frame, the second insulation layer and the second printed circuit to connect the first printed circuit to the second printed circuit.

6. (Original) The functional PCB module as claimed in claim 5, wherein an insulation well is formed around the outside of each via between the first insulation layer and the second insulation layer to insulate the via from the frame.

7. (Original) The functional PCB module as claimed in claim 3 further comprising:

a second insulation layer formed on the other side of the frame;
a second printed circuit layer formed on the second insulation layer; and
multiple vias each of which has an outside and is formed through the first printed circuit, the first insulation layer, the frame, the second insulation layer and

the second printed circuit to connect the first printed circuit to the second printed circuit.

8. (Original) The functional PCB module as claimed in claim 7, wherein each chip has multiple solder bumps formed respectively on the terminals, and the solder bumps are connected to the second printed circuit.

9. (Original) The functional PCB module as claimed in claim 7, wherein the bottom face of each chip is attached to the second printed circuit, and the terminals of each chip are connected to the second printed circuit by wire bindings.

10. (Original) The functional PCB module as claimed in claim 2 further comprising:

a second printed circuit layer formed on the second insulation layer; and multiple vias each of which has an outside and is formed through the first printed circuit, the frame and the second printed circuit to connect the first printed circuit to the second printed circuit.

11. (Original) The functional PCB module as claimed in claim 10, wherein an insulation well is formed around the outside of each via corresponding to the frame to insulate the via from the frame.

12. (Original) The functional PCB module as claimed in claim 11, wherein each chip has multiple solder bumps formed respectively on the terminals, and the solder bumps are connected to the second printed circuit.

13. (Original) The functional PCB module as claimed in claim 11, wherein the bottom face of each chip is mounted on the second printed circuit and the terminals of each chip are connected to the second printed circuit by wire binding.

14. (Currently amended) A multi-layer functional PCB having embedded chips, combining at least two functional PCB modules and a separation layer between adjacent functional PCB modules, each functional PCB module comprising:

a frame having two opposite sides and at least one chip ~~recess~~ hole defined ~~in~~ through the frame;

a first printed circuit formed on one of two opposite sides and insulated from the frame;

at least one chip mounted in the at least one chip ~~recess~~ hole and connected to the first printed circuit, wherein the at least one chip has a top face, a bottom face and multiple terminals formed on the top face and connected to the first printed circuit; and

insulation material filling the at least one chip ~~recess~~ hole.

15. (Original) The multi-layer functional PCB as claimed in claim 14, wherein each functional PCB module further comprises a second printed circuit formed on the other side of the frame and insulated from the frame; and

the multi-layer functional PCB further comprises multiple vias, each of which has an outside and is formed through adjacent functional PCB modules and

the separation layers to connect the first and second printed circuits on the functional PCB modules.

16. (Original) The multi-layer functional PCB as claimed in claim 15, wherein the frames in the functional PCB modules are metal and each functional PCB module further comprises:

- a first insulation layer between the first printed circuit and the frame; and
- a second insulation layer between the second printed circuit and the frame.

17. (Original) The multi-layer functional PCB as claimed in claim 16, wherein one functional PCB module further comprises multiple through holes corresponding to the terminals, wherein the multiple through holes are defined through the first insulation layers and a plug mounted in each through hole.

18. (Original) The multi-layer functional PCB as claimed in claim 16, wherein each chip of one functional PCB module has solder bumps formed respectively on the terminals to connect the terminals to the second printed circuit.

19. (Original) The multi-layer functional PCB as claimed in claim 16, wherein the bottom face of each chip of one functional PCB module is mounted on the second printed circuit, and the terminals are connected to the second printed circuit by wire bindings.

20. (Original) The multi-layer functional PCB as claimed in claim 18, wherein the bottom face of each chip of another functional PCB module is mounted on the second printed circuit, and the terminals are connected to the second printed circuit by wire bindings.